



Recovery Act Program Plan

For

Constellation Systems

Within the

**American Recovery and Reinvestment
Act of 2009**

Program: NASA Earth Science
TAFS: 80-0119
Submitted Date: May 15, 2009

Program-specific Recovery Plan for Recovery.gov	
Does this program align with an existing PART program?	Yes – Constellation Systems
Does this program align with an existing CFDA program?	Yes-Small Business Innovation Research
1. Objectives	
Program Purpose	The Constellation Systems Program develops crew transportation to the International Space Station (ISS), the Moon, Mars, and beyond. The Commercial Crew and Cargo Program supports development of U.S. commercial launch services for cargo and crew delivery to low Earth orbit and return, which could take over the ISS servicing function for NASA. NASA will use Recovery funding to accelerate investments in these two endeavors.
Public Benefits	<p>The Constellation Program is responsible for developing safe and robust capabilities for human space exploration. The program is applying Recovery Act funds to improve the likelihood of developing NASA systems to deliver astronauts to the International Space Station on schedule. These systems will enable exploration missions that will inspire the next generation of U.S. explorers, motivating younger generations to pursue careers in science and engineering.</p> <p>The Commercial Crew and Cargo program is applying Recovery Act funds to stimulate efforts within the private sector to develop and demonstrate technologies that enable commercial human spaceflight capabilities. These efforts are intended to foster entrepreneurial activity leading to job growth in engineering, analysis, design, and research, and to economic growth as capabilities for new markets are created. By developing commercial crew service providers, NASA may be able to purchase crew transportation and rescue services and to reduce the gap in U.S. spaceflight capability. For more information see http://www.nasa.gov/mission_pages/constellation/main/index.html and http://www.nasa.gov/offices/c3po/home/index.html.</p>
2. Projects and Activities:	
Kinds and scope of projects and activities to be performed	NASA will invest \$400M in Recovery Act funding for the Constellation Systems Program. The Constellation Systems Program consists of the Constellation and Commercial Crew and Cargo programs. Constellation systems in development include the Orion Crew Exploration Vehicle (CEV), the Ares I Crew Launch Vehicle (CLV), and supporting mission and ground support systems that will provide transportation to the Moon, Mars, and beyond. This effort will enable the U.S. to continue its leadership role in human exploration. The funds will support accelerated testing, procurement, and manufacturing to maximize NASA's ability to meet a March 2015 Initial Operational Capability (IOC) date, when crew will first be transported to the International Space Station.

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	<p>The Orion spacecraft is designed to carry crew members to and from the ISS, on lunar missions, and potentially to other destinations. Once in orbit, the Orion and its service module is planned to rendezvous and dock with either the ISS or the Altair lunar lander and the Ares V's Earth Departure Stage, which could propel astronauts on their way to the Moon. The Ares I rocket has two planned missions: lofting up astronauts to the ISS and for rendezvous with the Ares V Earth Departure Stage.</p> <p>The Commercial Crew and Cargo program is NASA's investment to help develop cost-effective systems to carry crew and cargo to the ISS. There are four defined capabilities to be developed and demonstrated by industry partners. These include cargo as well as crew transportation capabilities. These capabilities consist of: Capability A: delivery and disposal of external unpressurized cargo to and from the International Space Station; Capability B: delivery and disposal of internal pressurized cargo to and from the International Space Station; Capability C: delivery and return to Earth of internal pressurized cargo to and from the International Space Station; Capability D, crew transportation to and from the International Space Station</p> <p>Each Constellation project has a uniquely identified scope of work to be completed. The Program will use Recovery Act funds to supplement and enhance these efforts. NASA plans to apply funds toward the successful completion of the Orion, Ares and Ground Operations projects. The Commercial Crew Cargo Program is using Recovery Act funds to accelerate development of commercial access to space. Currently, NASA has only funded activities toward the demonstration of cargo transportation, i.e. Capabilities A-C. Recovery funds will be used to initiate investment toward Capability D, as described above.</p>
3. Characteristics:	
Types of Financial Awards to be used.	It is anticipated that the work will be performed under contracts, Space Act Agreements, or other appropriate acquisition methods. The type of agreement or funding instrument will depend upon the responses to the announcement.
Type of Recipient	The recipients of this work will be non-governmental for-profit organizations, including small businesses, and private non-profit institutions/organizations.
Type of Beneficiary	The primary beneficiaries are for-profit organizations and their "scientist/researcher" and "engineer" communities.
4. Major Planned Program Milestones:	
Schedule with milestones for major phases of the program's delivery	<p>Schedules for the detailed work have been identified within the projects and vetted with the contractors. Upon approval of funding for the unique categories within Constellation, changes will be made to the targeted contracts, and milestone dates and schedules will be authorized and released to proceed.</p> <p>Note the following milestones are subject to change, based on the complex and</p>

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	highly dynamic nature of research and development-type activities.
Milestone #1	Commercial Crew and Cargo program - Provide commercial crew concepts and enabling capabilities including but not limited to: launch abort systems, crew systems, Environmental Control and Life Support Systems (ECLSS), etc. to support future implementation of crew transportation capability demonstrations.
Expected Completion Date for Milestone #1	September 30, 2010
Milestone # 2	Complete design of ground support equipment, which provides services such as power and data connectivity to the Orion and Ares launch vehicle during processing in the Vehicle Assembly Building and at the launch pad.
Expected Completion Date for Milestone # 2	September 30, 2010
Milestone # 3	Complete design of a ground test article for the Orion project. The ground test article can be tested in ways that will damage the final flight article. Information from these tests will be used to validate key concepts and inform choices for the final Orion spacecraft design.
Expected Completion Date for Milestone #3	August 30, 2010
5. Monitoring and Evaluation:	
	<p>NASA uses multiple methods, processes, and entities for monitoring and evaluating its performance. These same processes and procedures will be used for activities funded under the Recovery Act. NASA's programs are assessed for relevance, quality, and performance. A relevance review assures alignment with national priorities; alignment with the NASA Strategic Plan; impact on related fields of research or technology; and alignment with "customer" (users of NASA data, research results, etc.) needs. Determining quality is generally prospective and assures "best value" for an investment, using peer review processes. Performance reviews evaluate whether a program is on track to meet its baseline performance commitments (cost, schedule, science/technical deliverable).</p> <p>Reviews are conducted internal and external to the Agency. External evaluations are performed by entities such as the NASA Advisory Council (NAC) and the National Research Council to assess NASA's program content and direction. Additional independent reviews are commissioned by the NASA Administrator or responsible mission organization to review programs for relevance and quality, as well as performance. Reviews are rigorous and methodical and focused on the program's methods, results, and findings by others in the field with requisite expertise, and independence.</p> <p>Responsibility for program and project management and their control mechanisms (NASA Procedural Requirements (NPR) 7120 series)*, institutional management</p>

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	<p>(NPR 8500 series)*, and financial management (NPR 9010 and 9120 series)*, occurs at all management levels of the Agency. NASA's management monitors different aspects of program or institutional performance, at the highest Agency levels, and uses a rigorous structure of program and management reviews for Agency-level decisions. To continue through each phase of development, programs must demonstrate, on an on-going basis and at key life cycle junctures, an ability to manage in a manner that produces identifiable results, and must document performance against previously defined commitments including multi-year outputs, annual performance goals, milestones and other metrics, as appropriate.</p> <p>NASA internally monitors performance through monthly and quarterly reviews, at each management level. At the senior management level, program reviews, accompanied by an independent (internal) assessment, occur across all mission areas (aeronautics, science, space operations and exploration systems), with an in-depth review each quarter rotating among the mission organizations. Senior management also reviews institutional data (finance, human capital, acquisition, infrastructure), and aggregated Agency measures and metrics, e.g., safety, cross-cutting technical and non-technical issues. The data reviewed, and the accompanying analysis, allows the Agency to focus on, and proactively address, issues that could lead to not achieving desired performance goals.</p> <p>Specifically, the Constellation Systems Program measures progress through the use of an Earned Value Measurement System (EVMS), which is applied across all projects. Contractors are also required to have an EVMS and submit monthly EVM data. In addition, program performance information is reviewed through monthly and quarterly progress reports, Agency level non-advocate programmatic reviews, and program and project level technical reviews, as fits Agency standard process outlined above. Constellation will collect a wide range of cost and schedule data in addition to these reviews to assess whether projects are able to meet milestones and deliverables, and make management decisions as appropriate to meet performance goals. Constellation managers are held accountable for cost, schedule, and performance. Contract incentives are planned for Constellation contracts related to cost and schedule performance.</p> <p>* The NASA Online Directives Information System Library, ensures access by NASA employees and contractors to the most current documentation.</p>
6. Measures:	
Measure Text	Commercial Crew and Cargo: Percent complete of partnership agreement milestones.
Measure Type	Outcome
Measure Frequency	Quarterly
Direction of Measure	+
Unit of Measure	Percent

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Explanation of Measure	This measure tracks programmatic and technical progress of funded partners as they execute their respective crew concepts and enabling capability efforts as defined and agreed to in funded agreements.
Year	FY 2009, FY 2010
Original Program Target	90
Revised Full Program Target	90
Target (incremental change in performance)	0
Actual	
Goal Lead	Director, Constellation Systems Division, Exploration Mission Directorate
Measure Text	Orion: Percentage of ground test article engineering tasks complete.
Measure Type	Output
Measure Frequency	Quarterly
Direction of Measure	+
Unit of Measure	Percent
Explanation of Measure	The Constellation Systems Program will use Recovery funds for Orion ground test article engineering and design. The ground test article can be tested in ways that will damage the final flight article. Information from these tests will be used to validate key concepts and inform choices for the final Orion spacecraft design. A schedule will be developed for the ground test article engineering and design tasks. On a quarterly basis this schedule will be assessed as to what percentage of these tasks are on schedule or complete.
Year	FY 2009, FY 2010
Original Program Target	90
Revised Full Program Target	90
Target (incremental change in performance)	0
Actual	
Goal Lead	Director, Constellation Systems Division, Exploration Mission Directorate
Measure Text	Ground Operations: Percentage of Ground Operations Ground Support Equipment design tasks complete.
Measure Type	Outcome
Measure Frequency	Long-term/Annual

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Direction of Measure	+
Unit of Measure	Percent
Explanation of Measure	The Constellation Systems Program will use Recovery funds for Ground Operations Ground Support Equipment (GSE) engineering and design. This ground support equipment provides services such as power and data connectivity to the Orion and Ares launch vehicle during processing in the Vehicle Assembly Building and at the launch pad. There will be a schedule developed for completion of these engineering tasks. On a quarterly basis it will be assessed as to what percentage of these tasks are on schedule.
Year	FY 2009, FY 2010
Original Program Target	90
Revised Full Program Target	90
Target (incremental change in performance)	0
Actual	
Goal Lead	Director, Constellation Systems Division, Exploration Mission Directorate
Measure Text	Variance from the planned cumulative obligations for the Constellation Systems Program.
Measure Type	Output
Measure Frequency	Quarterly
Direction of Measure	+
Unit of Measure	Percent
Explanation of Measure	<p>A key aspect of the American Recovery and Reinvestment Act, is to assure the timely obligation of funds to the intended beneficiaries. NASA plans to make every effort to assure this happens on the plan that it has put forward, which has been designed to also maintain a prudent use of taxpayer funds, and provide key research and development program deliverables to the benefit of the public. An obligation of funds means a binding agreement is made with NASA's contractors and grantees that will result in outlays (or a payment for the services or goods they provided), immediately or in the future. NASA will measure its progress toward the planned obligations to-date, on a quarterly basis.</p> <p>NASA's baseline obligation plan (when available) is posted at www.nasa.gov/Recovery/.</p>

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Year	2009, 2010
Original Program Target	10
Revised Full Program Target	10
Target (incremental change in performance)	0
Actual	
Goal Lead	Director, Constellation Systems Division, Exploration Mission Directorate
Measure Text	Variance from the planned cumulative outlays for the Constellation Systems Program.
Measure Type	Output
Measure Frequency	Quarterly
Direction of Measure	+
Unit of Measure	Percent
Explanation of Measure	<p>A key aspect of the American Recovery and Reinvestment Act, is to assure the timely outlay of funds to the intended beneficiaries. NASA plans to make every effort to assure this happens on the plan that it has put forward, which has been designed to also maintain a prudent use of taxpayer funds, and provide key research and development program deliverables to the benefit of the public. An outlay of funds means a payment that fulfills an obligation and is the measure of Government spending. This is a payment for the services or goods the contractor or grantee provided. NASA will measure its progress toward the planned outlays to-date, on a quarterly basis.</p> <p>NASA's baseline outlay plan (when available) is posted at www.nasa.gov/Recovery/.</p>
Year	2009, 2010
Original Program Target	10
Revised Full Program Target	10
Target (incremental change in performance)	0
Actual	
Goal Lead	Director, Constellation Systems Division, Exploration Mission Directorate

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7. Transparency and Accountability:	
	<p>NASA currently utilizes multiple methods to assure transparency and accountability, and will apply these standard processes and procedures to activities supported by Recovery Act funds. The principle of transparency is applied to program and fund allocation planning methods, and in reporting, both internal and external to the Agency, of progress toward the resultant plans. NASA requires accountability at all levels of management and from all of its cost-sharing and non-cost sharing partners, contractors, and grantees for the timely delivery and quality of products.</p> <p>Rigor is applied to NASA programs' design, structure, management, and funding to ensure that resources reach the intended beneficiaries and address the programs' purpose directly. Transparent, merit-based criteria and decision-making procedures are employed at multiple steps in this process. Governing documents, such as the NASA Strategic Plan and supporting mission specific plans, guide the activities of these programs and provide the context through which specific science and research objectives are formulated, investigations are solicited, and missions or activities that address them are planned. Missions are prioritized on the basis of expert opinion such as Decadal Surveys on science, available budget resources, technological maturity, and partnering opportunities.</p> <p>As explained in detail in the Monitoring and Evaluation Section of this Program Plan, NASA will employ multiple methods of review and evaluation of progress toward the goals of this Program Plan. These reviews will assure that funds are being utilized as intended and are delivering on their committed objectives. Managers at all levels will be held accountable both via review of their progress and individual performance plans. At NASA, all employee performance plans for Federal managers include elements tied to the program plans for which they are responsible.</p> <p>Contractors will be held accountable for the timely delivery and quality of products. Award fee reviews, where appropriate, will be performed on contracts and past performance evaluations are integral in solicitation criteria. Grants and cooperative agreements are subject whenever possible to deliverables and milestones that must be met in order to receive funding renewal. International and Federal government partners work in accordance with applicable Memoranda of Understanding (MoUs) and agreements, which generally detail schedule and performance commitments.</p> <p>Contractor and government accounting systems are audited periodically to ensure compliance with government standards. Specific reports that record and track the obligation and expenditure of program funds are as follows: contractor monthly and quarterly reports, reports on budget execution and budgetary resources, the year-end closing statement, and the annual Performance and Accountability Report. Additionally, NASA will cooperate with the Government Accountability Office and the NASA Office of Inspector General through various engagements and audits that monitor specific items dealing with Recovery funds.</p>

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	<p>To assure transparency and accountability to the public and its key stakeholders, NASA will post its current plans, and outline any revisions to previous versions on the Agency Recovery Act website. Information will be available on key events, the status of on-going activities, outcomes of Inspector General Audits and the accomplishment of and performance toward, annual and long-term Recovery Program goals. Web links will be provided, where applicable to posted solicitations, awards, and grantee performance, among other relevant information. For this important information on NASA efforts surrounding its Recovery Act funds, see http://www.nasa.gov/recovery/.</p>
8. Federal Infrastructure Investments:	
Description of Agency plans to spend funds effectively to comply with energy efficiency and green building requirements	Not applicable